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from the data obtained. The ore seams maintain a fairly constant horizon in the series, so that there need be little error in estimating the depth at which they will be encountered in most places.

The exploratory work was performed entirely with a diamond core drill, by which means a core, one inch in diameter, representing a section of the rocks and ore penetrated, was secured. Eight holes were put down at intervals of about 10 miles between Verona Station, Oneida County, and Wallington, Wayne County. The details of the rock sections thus obtained are presented in tables. Only one test hole, that at Lakeport, gave indications unfavourable to the presence of any considerable body of ore. The ores belong to the red, earthy variety of hematite and the iron content is from 35 to 45 per cent.

In the calculation that the quantity of ore available in the region examined is approximately 600,000,000 tons, all ore was excluded that is below 18 inches thick or more than 500 feet from the surface. The larger part of the ore available for underground mining is in the western areas of Cayuga and Wayne Counties. The report says that the volume of ore is so large that "it must be considered as one of the important reserves in the present fields of iron mining. A great proportion, of course, will not be subject to profitable extraction for many years to come. But if limitations be put upon the estimate so as to bring it into relation more or less close with the existing status of the mining industry, the total will still be large." The report covers 76 pp. with three maps, a considerable number of photographs and a bibliography.

A GEOGRAPHIC INTERPRETATION OF NEW YORK CITY, PART III—(CONCLUSION).*

BY

F. V. EMERSON.

THE RAILROADS AND NEW YORK.—The period of about twenty-five years from the opening of the Erie Canal was one of great activity in canal building. Hundreds of miles were built, but most of the canals were to be abandoned before they could be brought to a paying basis. In most cases the competition of the railroad

* Part I printed in BULLETIN in October and Part II in December, 1908.

was the cause of the failure of the canal. The success of the English canals, which had been a strong incentive to canal construction in America, had been largely achieved before the effective building and operation of the railroads. By 1880, out of a total of 4,468.6 miles of canal built in the United States—most of them built prior to 1850—1,953.56 miles or 43.7 per cent. had been abandoned.*

It was fortunate for New York City that its supremacy did not rest on the great canal alone. The first railroads were not thought of as competitors of the canal for freight. They were built for passenger traffic.†

Boston, Philadelphia and Baltimore, the principal rivals of New York, saw in the railroad an opportunity to overcome that city's advantage of interior communications. The railroad could climb grades and cross divides that were impossible to the canal and often their initial cost was less. We have seen that Pennsylvania completed in 1834 a line of railroad and canal from Philadelphia to Pittsburg. In 1857 the State sold the system to the Pennsylvania Railroad for \$7,000,000. This railroad had paralleled the canal and absorbed its traffic. The Appalachian Ridges and the Eastern Alleghany Plateau through which the easterly state system ran was not densely populated nor productive. The resources of coal and iron contained in this region were not early developed.

The merchants of Baltimore looked with suspicion upon the Chesapeake and Ohio Canal project, since its terminus was not at Baltimore, and in 1828 the Baltimore and Ohio Railroad was begun. Like the Pennsylvania system, it must cross the Appalachian Ridge belt and the Eastern Alleghany Plateau. The interest of the city and State in the project is shown in the fact that Baltimore subscribed \$3,500,000 and the State of Maryland \$4,000,000 to the capital stock. The State, moreover, according to the charter,

* See tables, census of 1880, Vol. IV, Canals.

† This is shown by the receipts of two early roads. Receipts from the system that afterwards became the New York Central:

	PASSENGERS.	FREIGHT.
1843.....	1,008,026	103,093
1858.....	2,532,647	3,995,766
1902.....	19,183,000	35,939,111
Receipts from the Erie Railroad:		
1851.....	1,163,536	1,196,337
1858.....	1,182,258	3 969,358

From Report of N.Y. Cham. of Com., p. 58, and Statistics of Railways in the U. S., 1502, pp. 358-9.

released the corporation from all taxation in perpetuity.* The road tapped the coal regions of the State and gave cheap and effective transportation for Maryland's flour and tobacco, but by 1852, when it reached Wheeling, it could not to any extent divert the grain trade that went to New York.

The railroad from Boston to Albany was completed in 1842. It could not effectively compete with the navigable Hudson in offering a route from the eastern terminus of the Erie Canal to the seaboard.

In contrast with these energetic measures, New York did little to secure a through line of railroad to her hinterland. The early and successful growth of such a connection was largely in response to geographical advantages. The fertile lands along the Erie Canal located a dense population, while the cheap raw materials, excellent transportation facilities and good Western market, were responsible for the growth of manufacturing centres, in spite of the lack of convenient coal supplies. The railroads of the canal belt therefore originated to supply local demands, and they show a progressive growth from east to west. The easy grades and productive territory are shown in the cheap construction and good returns of the roads through the Mohawk Valley and Lake Plains.†

In contrast with the railroad development from Albany to Buffalo, the road up the narrow and relatively infertile Hudson Valley grew slowly and did not reach Albany until 1851 (Fig. 32). Philadelphia and Baltimore had in the meantime become centres for radiating lines by which their local hinterlands were reached (Fig. 33).

The value and population of the canal belt are shown by a comparison of the counties lying in or near this valley. The grouping of counties given below follows that of the New York

* "Hepburn Report," Vol. V, p. 23

†	COMPLETED LENGTH IN MILES.		TOTAL COST.	AVERAGE COST PER MILE.	NET PER CENT.
Albany & Schenectady.....	1831....	16.91	\$1,606,196	\$94,985	6.2
Utica & Schenectady.....	1836....	78.	3,222,946	41,384	16.4
Syracuse & Utica.....	1839....	54.8	1,968,036	37,273	13.1
Auburn & Syracuse.....	1838....	26.	1,125,886	43,303	9.1
Auburn & Rochester.....	1841....	78.	2,644,520	33,904	10.
Rochester & Tonawanda.....	1838....	43.5	974,865	22,470	18.2
Attica & Buffalo.....	1838....	31.5	821,313	26,073	10.3
Buffalo & Niagara Falls....	1838....	22.	250,396	11,381	14.2
		350.71			

† "Transportation Systems of the United States," J. L. Ringwalt, 1888, p. 127.

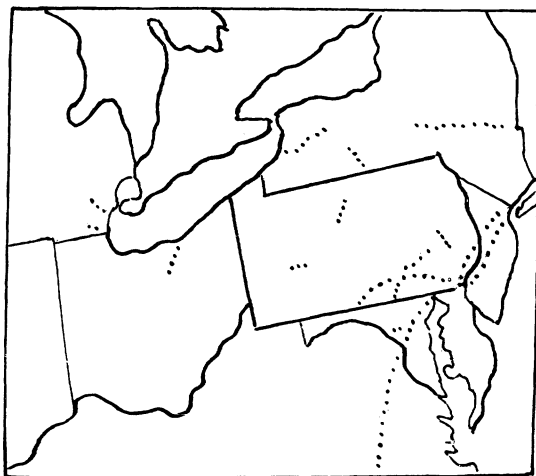


FIG. 32.—Railroads built by 1840.
Coman, "Industrial History of the United States," p. 235.

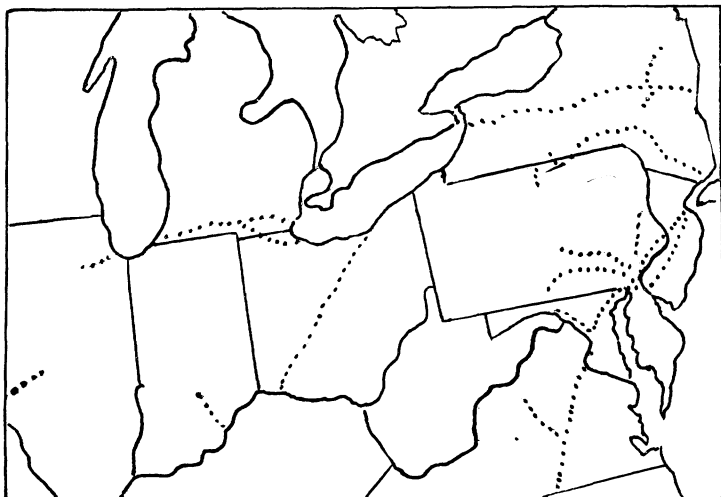


FIG. 33.—Railroads built by 1850.
Coman, "Industrial History of the United States," p. 238.

Committee on Canals, 1899. The so-called canal counties are as follows:

Albany,	Genesee,	Monroe,	Ontario,	Schenectady,
Cayuga,	Herkimer,	Niagara,	Orleans,	Seneca,
Erie,	Livingston,	Onondaga,	Oswego,	Wayne,
Fulton,	Montgomery,	Oneida,	Saratoga,	Wyoming.

The non-canal counties are:

Allegany,	Chautauqua,	Cortland,	Schoharie,	Tioga,
Broome,	Chenango,	Delaware,	Schuyler,	Tompkins,
Cattaraugus,	Chemung,	Otsego,	Steuben,	Yates.

The figures showing a comparison of the two sets of counties are as follows, according to the census reports:

	VALUE OF FARMS WITH IMPROVEMENTS AND IMPLEMENTS.	POPULATION.	NUMBER OF ACRES IMPROVED.	NUMBER OF ACRES UNIMPROVED.
Canal Counties:				
1850.....	\$231,967,183	932,585	4,606,579	1,935,413
1880.....	452,557,446	1,404,795	6,261,385	1,518,980
1900.....	368,773,030	1,838,602	5,549,580	1,582,010
Non-Canal Counties:				
1850.....	119,148,862	539,711	3,238,974	2,370,821
1880.....	247,056,192	634,883	5,099,918	1,881,560
1900.....	222,833,910	685,750	4,834,012	1,878,622

The canal counties in 1900 contained nearly three times the population of the non-canal counties, about one-third more value in farms, and in the former region the proportion of improved to unimproved land is three and one-half, while in the latter region the proportion is two and two-thirds.

The completion of the New York Central and Hudson River roads and of the Erie at the time of active development of railroads in the Upper Mississippi Valley, gave New York a somewhat brief continuation of the practical monopoly of the export and import trade of that region so far as the trade tended eastward, which that city had enjoyed from the Erie Canal. And when the Pennsylvania and the Baltimore and Ohio systems finally completed connections with the Upper Mississippi Valley in the decade between 1850 and 1860, they were compelled by the preëminence of New York, to fix rates for, and compete for, transportation to that port.

In 1839 was begun the part of a series of railroads that in 1853 became the railroad connection between Chicago and Buffalo. Partly by State aid and partly by individual corporations the road was built as separate units, and was finally united in the Lake Shore and Michigan Southern. The route, following the narrow

plain at the foot of the Alleghany escarpment, used many of the beach ridges in Ohio and crossed the prairie plains of Indiana and Illinois to Chicago. It intersected the north-south roads that had previously been built. In four years, 1856-59, the road doubled its traffic, and in the twenty-four years, from 1856 to 1880, its traffic increased thirty-two fold in spite of decreasing rates.*

New York was also the terminus of the Erie, the second line of railroad to cross the Alleghany Plateau, but the building of the Erie Road was in defiance of geographic conditions rather than in conformity thereto. The Erie Railroad was chartered in 1832, and a company organized in 1833. The promoters, possibly deceived by the ease of building and good returns of the roads in the Mohawk Valley, at first estimated the cost at only \$3,000,000, but it was not opened to Dunkirk, on Lake Erie, until twenty years later. The route led across the Appalachian ridges, and was transverse to the general north-south courses of the valleys in the Alleghany Plateau (Fig. 34). Moreover, its tributary territory was largely the dissected Alleghany Plateau, without people or products to make the road profitable. Like most of the other early trans-Appalachian roads south of the Mohawk, the Erie was in part built with State aid.

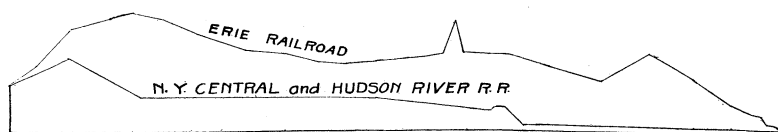


FIG. 34.—Profiles of the Erie and the New York Central Railroads.
“Annual Report of the State Engineer and Surveyor of New York, 1905.”

In all comparisons in which physiographic features are a factor, the preëminence of the Mohawk-Lake Plains route is evident. Taking the early trunk lines, their grades give a fair indication of ease of construction, as the following table indicates:

	SUM OF ASCENTS.	TOTAL LENGTH.	LEVEL TRACK.
	Feet.	Miles.	Miles.
New York Central, New York to Buffalo.....	1,695.51	440.32	211.52
Erie Railroad, New York to Dunkirk.....	4,233.70	460.03	109.47
Pennsylvania, Harrisburg to Pittsburg.....	2,959.23	247.51	42.77 †

* “Poor’s Manual,” 1881, p. 517.

† “Tenth Census,” Vol. IV, Table X.

The cost per mile of various railroads brings out the advantage of the Mohawk-Lake Plains route, as will appear from the following comparisons: New York, Buffalo to Albany, about \$24,000; Erie, New York to Dunkirk, \$60,000; Pennsylvania, Harrisburg to Pittsburgh, \$50,000; Baltimore and Ohio, Baltimore to Wheeling, \$47,000.

In the thirties New York was connected with Philadelphia both by canal and railroad, the route of both being in large part the Cretaceous lowland.

While the railroads in the Mohawk Valley and Lake Plain were developing, the same geographic factors in the Ohio region that invited the building of canals were making for the construction of railroads. By 1840 a few short lines reached from Lake ports into the interior (Fig. 32). But soon the easy grades and dense population of Ohio hastened the building of railroads. The railroads followed the north-south direction of the rivers and canals. In 1848 the Mad River Railroad connected Sandusky on Lake Erie and Dayton, where there was also canal connection with Toledo and Cincinnati. In 1846 the Little Miami connected Springfield and Cincinnati, and in 1851 Cleveland and Cincinnati were connected. In 1854 the Chicago and Rock Island Railroad reached the Mississippi River. This road diverted to the Lake traffic much of the trade that formerly went down the Mississippi.*

In the decade from 1840 to 1850 the Ohio canals felt the rapidly growing competition of the railroads, and their traffic fell off in a marked degree. The Erie Canal in the next decade felt the same competition. In 1864 the railroad tonnage in New York for the first time exceeded the canal tonnage. After 1865 the percentage of tonnage carried by the Erie Canal decreased rapidly (Fig. 35).

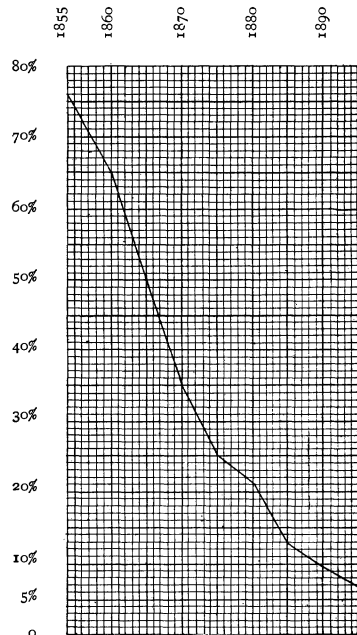


FIG. 35.—Percentage of total tonnage in New York carried by canals.
 "New York Report on Canals," p. 181.

* "Poor's Manual," 1881, pp. xxiii-iv.

The reason for this decline in canal traffic in all parts of the United States lay in the growing efficiency of the railroads as compared with that of the canals. Canal movement is slow, and because of their location in northern latitudes, the principal canals of the United States are frozen for several months each year when the movement of agricultural products is most active.*

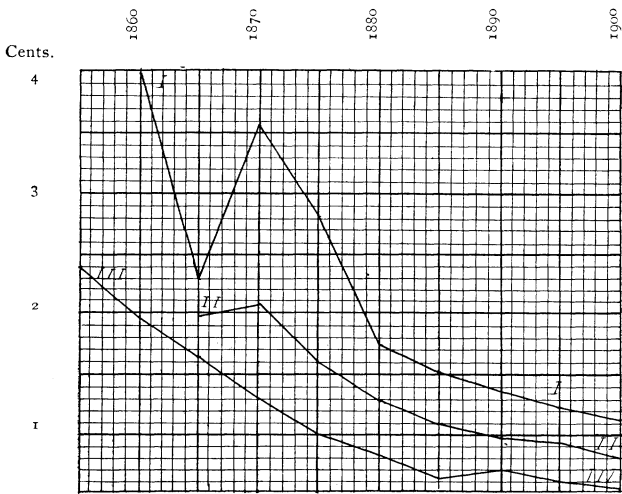


FIG. 36.—Average freight rates per ton-mile for five-year periods on three groups of railroads: I, The Fitchburg, Boston & Maine; New York, New Haven & Hartford, and the Boston & Albany. II, The Illinois Central, Chicago & Alton, and the Rock Island. III, The Erie, New York Central & Hudson River, Lake Shore & Michigan Southern, and the Pennsylvania.
From Tables in "Changes in the Rates of Charge for Railroad and Other Transportation Services," by H. T. Newcomb, 1901.

The railroads have been increasing the size of their cars and the tonnage of their loads. Up to 1850 the maximum train load on the New York Central was 200 tons or about three or four boat loads at that time. In 1880 the freight train loads averaged about 1,000 tons. At that time the maximum barge capacity was about 240 tons. Since then train loads of 2,000 tons are not uncommon.

* The average dates of the opening and closing of the Erie Canal are given as follows :

	AVERAGE CLOS- ING DATE.	AVERAGE OPEN- ING DATE.
Albany.....	Nov. 15	Mar. 30
Buffalo.....	Dec. 12	Apr. 9
Erie Canal.....	Dec. 5	Apr. 27

Report of the U. S. Waterway Commission.

Moreover, railroads are adaptable. They can be extended to tap almost any region, and when freight is in the car the tendency is for it not to leave the car in which it is loaded until the destination is reached.

THE GREAT LAKES.—We have seen that the Lake route and the Erie Canal turned the export trade of much of the northern Mississippi Valley to New York. The all-water route to the seashoard had another far-reaching economic effect when the railroad period came in; an effect, on the whole, still favouring New York, but not so partially as before the advent of the railroads.

The Great Lakes are navigable for vessels of considerable draught from Buffalo to Duluth. This waterway, probably the best inland water route in the world, has an exceedingly important economic-geographic influence in its effect on freight rates, a factor that often makes or unmakes commercial centers. The advantage of a free water route is that competition is open and the tendency is towards the maintenance of low freight

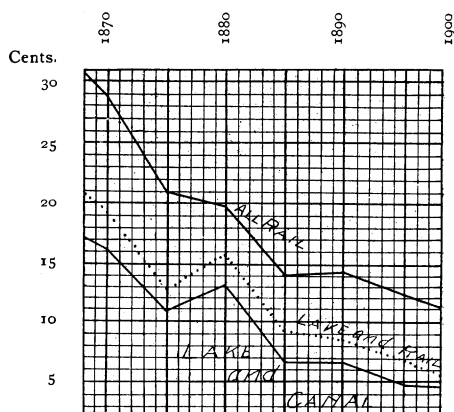


FIG. 37.—Freight rates on wheat per bushel in five-year periods, 1868-1908.
"Report on New York Canals," p. 190.

rates. The competition, both active and potential, of the Lake route with the railroads which parallel it has made long-distance freight rates in that region the lowest in the world.* The effectiveness of water competition is brought out in a study of three groups of roads that may be taken as examples (Fig. 36). One group has its direction approximately parallel to the Lakes, another is roughly perpendicular to the trend of the Lakes, and the third is in New England, where water competition is not important and hauls are

* The rates since 1868 are given as follows:

	ALL RAIL.	LAKE AND RAIL.	LAKE AND CANAL.
1868.....	30.49	20.76	17.33
1880.....	19.90	15.70	13.27
1890.....	14.31	8.50	6.72
1908.....	11.55	5.40	4.82

"Report on New York Canals," p. 190.

relatively short. The low freights on the railroads in competition with the Lake route must be due largely to water competition. The same tendency is shown in Fig. 37, where the canal rates are a factor. Moreover, it is probable that the actual railroad rates were often lower than the published rates shown in the graphs, or the rail roads could not have secured so large a portion of the traffic or competed so successfully even during the navigation season.*

The effective competition of the railroad with the canal preceded that of the railroad with the Lake route. Prior to the seventies the Lakes were the favourite route for grain shipments. As is usually the case, the manufactured product of greater value for given weight passed to railroad carriage before the raw material. In the sixties flour shipments eastward by rail be-

gan, and continued to exceed those by boat (Fig. 38). About 1873 the railroads became strong competitors for east-bound wheat shipments (Fig. 39), and in 1876 a considerable portion of corn shipments passed to railroad carriage.†

Much of this grain movement by railroad centers upon New York and makes that port the principal port of grain export in the United States. So long as the water route is an actual or potential competitor of the railroads, the railroads will be compelled to make rates to move freight to New York.

The easy pathway by the Lakes to the Sea was retroactive in its effects. The growing population in the hinterland of New York not only sent an increasing export tonnage to New York, but it became a consumer of a rapidly increasing tonnage of imports.

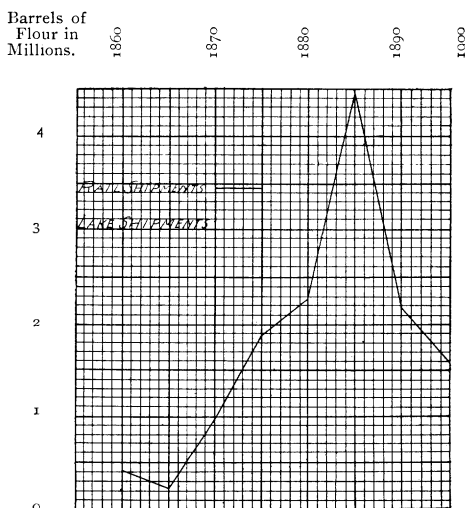


FIG. 38.—East-bound shipments of flour from Chicago in five-year periods, 1860-1900.

Tunell's "Statistics of Lake Commerce," p. 53.

* George G. Tunell, "Statistics of Lake Commerce"; 55th Congress, 2nd Session, Document No. 277, 1898, p. 36.

† Tunell, *ibid.*, page 54.

To a considerable extent, exports control imports, and, other things being equal, ships will bring their cargo to the port where they can best secure a return tonnage. The pre-eminence of New York, therefore, as the leading port of import in the United States, grows out of her export trade.

THE MINOR GEOGRAPHIC FACTORS.—The discussion heretofore has been given mainly to the larger hinterland of New York, upon which the supremacy of the city has been founded. Minor factors have been important, although, with the excellent route from the city to the interior, it is probable that the export trade along that route would have located a great export port in the vicinity of New York, had its local advantages been of the poorest for commerce.

THE HARBOUR.—An ideal harbour should afford: (1) anchorage and easy movement for the largest vessels; (2) easy access to the sea; (3) moderately deep water near the shore for convenient and easy wharfage; (4) protection from waves and winds; (5) easy fortification; (6) freedom from ice.*

The same continental sinking that drowned the Hudson also produced Long Island Sound. This waterway, with its tributary estuaries on the north, afforded a protected course for the early traffic between New York and southern New England. The lower Hudson, which, with the East River, constitutes the harbour of Greater New York and Jersey City, has an extent and depth sufficient for many times its present commerce. The depth of this fine

Bushels in
Millions.

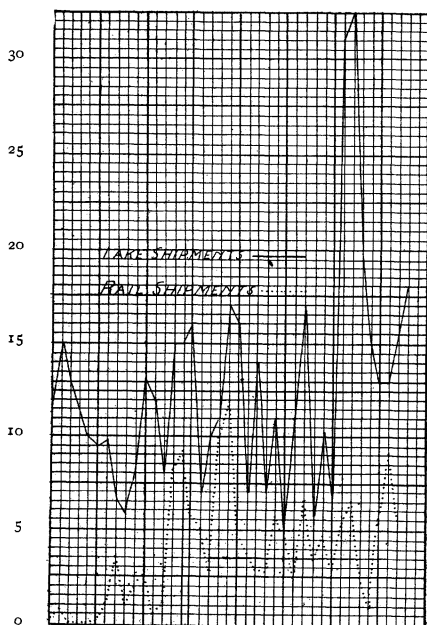


FIG. 39.—East-bound shipments of wheat from Chicago by rail and by lake from 1860 to 1900. Tunell's "Statistics of Lake Commerce," p. 53.

* "The Organization of Ocean Commerce," J. R. Smith, 1905, p. 124.

harbour is of increasing importance, for the tendency of modern commerce is toward ships of larger and larger draught.

The opening of a harbour to the sea is a vital and often troublesome factor. The success or failure of a modern harbour often depends upon its accessibility to the vessels of deep draught which modern commerce demands. A common difficulty with an estuary harbour, such as that of New York, is the bar across the channel that is built where the outward flowing river loses its carrying power. Several features in New York harbour reduce this difficulty. The Hudson River carries but little silt. It has been mentioned before that its catchment basin is below the average for rivers of the same length. The Mohawk and Upper Hudson deposit most of their load far above the harbour, shortly after reaching tide water. Moreover, the Hudson is narrow and the flood and ebb tides are strong. The ebb tide through the narrows has cut the main channel leading to the city, and the passage of the ebb and flood tides past Sandy Hook has extended that channel seaward.* The most serious menace to the harbour is the load which the shore currents are bringing northward along the coast of New Jersey. They tend to extend Sandy Hook across the harbour mouth. There is also some shore drift from the Long Island shore.†

A comparative measure of the value of this tidal scour is found in the dredging expenses of various harbours. According to the records of the House documents from 1895 to 1903 the expenditures for harbours, largely for dredging and clearing, were as follows:

New York.....	\$1,035,300.00
Philadelphia.....	2,710,000.00
Delaware Breakwater.....	1,185,000.00
Boston.....	1,501,168.75
Baltimore.....	470,000.00
New Orleans.....	1,404,845.30

The showing is very favourable to New York Harbour. If the Delaware Breakwater expenses are added to those of Philadelphia, the expense of that port is nearly four times as great as that of New York.

The comparative freedom from silt and the strong tidal scour in the Hudson and East Rivers, together with the drowning of the region, afford deep water near the shore. This factor makes easy

* L. M. Haupt, "Changes along the New Jersey Coast." Annual report of the New Jersey Geological Survey, 1905, p. 83.

† Haupt, *ibid.*, p. 79.

the building of piers and also permits the vessels to lie at right angles to the shore, thus saving shore space and allowing commerce to concentrate*. Thus the enormous commerce of the city is concentrated at the lower end of Manhattan Island and along the opposite shores in New Jersey and Long Island. The rental of wharfage privileges yields to the city over \$2,000,000 per year.†

THE TERMINAL MORaine.—The terminal moraine which crosses at the Narrows, besides accentuating the tidal scour by narrowing the channel, furnishes sites for easy fortification. The narrow entrance to Long Island is another factor of the same sort, and the projecting Sandy Hook is utilized for the purposes of fortification. The Highlands, the Triassic Trap Ridges on the north, and the terminal moraine on Long Island give some protection from wind. Ice does not interfere, to any extent, with the traffic of the harbour, as the water is too salt for easy freezing, both in the harbour and in the tributary Hudson.

THE COAL FIELDS.—The anthracite and bituminous coal fields of Pennsylvania are an exceedingly important factor in the development of modern New York. Cheap and good fuel, together with excellent transportation facilities to the coal fields, have aided in making New York a leading manufacturing as well as commercial city. New York has also a large coastwise coal trade.‡

THE GEOGRAPHIC-SOCIAL AND ECONOMIC FACTORS.—The preceding discussion has dealt with what may be called the physical geographic features of New York. Another phase of the city's geographic development may be considered under the head of social factors. They deal not so much with the influence of physical factors as the influence of man upon man. Here the distinction between influence dependent upon earth control and those emanating from complex social causes is not clear.

MANUFACTURES.—Given any cause for a city, whether, like St. Petersburg, it originates in a royal edict, a fortified site, as Rome, or a situation favourable for commerce, as New York, and a population of diversified occupations will gather. The primary occupations of a modern city are manufacturing and commerce, but a host of subsidiary trades and occupations grow up. A compilation from

*Smith, *Ibid.*, p. 125.

†Municipal Affairs, 1898, p. 2.

‡In 1904 the following shipments took place:

	ANTHRACITE	BITUMINOUS
New York.....	7,647,432 T	19,340,002 T
Philadelphia.....	3,306,846 T	5,066,386 T
Baltimore.....	217,705 T	1,892,740 T

the census of 1900 shows the importance of trade and manufactures in four cities.

Percentage of persons engaged in trade and transportation :

Greater New York.....	35	per cent. of total working population.
Philadelphia.....	24	“ “ “ “
Boston.....	34	“ “ “ “
Chicago.....	32	“ “ “ “

Percentage of persons engaged in manufacturing and mechanical arts:

Greater New York... ..	37	per cent. of total working population.
Philadelphia.....	41	“ “ “ “
Boston.....	32	“ “ “ “
Chicago.....	35	“ “ “ “

The modern commercial city tends to become a manufacturing center. Good transportation, concentration of capital, access to markets, are factors. Many goods are best manufactured at the place of meeting of their constituent materials. The exports for 1900 had 35.6 per cent. of products manufactured in the city and its immediate environs.* New York is thus seen to be the greatest manufacturing as well as the greatest commercial city in the United States. Including the adjoining counties with the cities, the following figures of the value of manufactures are given in the Twelfth Census:

Greater New York and vicinity.....	\$1,798,020,115.00
Chicago “ “	1,004,414,962.00
Philadelphia “ “	732,137,957.00
Boston “ “	576,705,204.00

The influence of the variety of imports and exports at New York is reflected in the manufacturing. There is no predominating manufacturing industry. The number of establishments is large and the capital invested in each establishment is relatively small.

These conclusions are readily inferred from the following figures, as to the number of manufacturing establishments: †

Greater New York and Jersey City.....	38,846
Philadelphia.....	15,887
Chicago.....	19,203

	CAPITAL PER ESTABLISHMENT.	WAGE EARNERS PER ESTABLISHMENT.	VALUE OF PRODUCT PER ESTABLISHMENT.
Greater N.Y. and Jersey City.	\$24,748	11.9	\$35,894
Philadelphia	29,994	15.5	38,803
Chicago.....	27,805	13.6	46,333

* “The Erie Canal and Transportation”: E. P. North, *North American Review*, January, 1900.

† “Twelfth Census,” Vol. VIII, Part I.

The following list includes the principal articles in the manufacture of which New York stands first, according to the reports of the Twelfth Census:

Newspapers and periodicals.	Hats and caps.
Printing and publishing.	Men's clothing, factory product.
Bookbinding.	Women's clothing, " "
Shipbuilding.	Brooms and brushes.
Shirts.	Coffee and spice roasting.
Wholesale slaughtering.	Cordage and twine.
Soaps.	Malt liquors.
Cigars and cigarettes.	Musical instruments.
Steam fittings.	Patent medicines.
Men's furnishing goods.	Foundry and machine-shop products.

These industries are founded upon a large consuming population, a supply of varied materials, cheap fuel and, probably most of all, upon the abundant and cheap labour. This latter factor, a result of dense population, is common to all cities, but in this case it is, perhaps, accentuated by the fact that the city is on an island and the population can not easily avoid congestion by spreading to suburbs. Moreover, the position of New York, as the principal port of immigration, produces a constant surplus of cheap labour.

TRADE AND TRANSPORTATION.—Perhaps the most spectacular factor in the growth of a commercial city is the break in transportation which usually occurs.* The freight from the river and railroads at New York is transferred to vessels for the coastwise or foreign trade. A mere transfer of goods without change of ownership will cause a considerable concentration of population, but the place where a transfer both of goods and ownership occurs must be a commercial center.† Merchants, brokers, bankers, and others, are required to handle the transfer, and their presence requires a still larger body of workers of other classes.

It is interesting to note that early Dutch colonists realized the value to their town of this transfer. During Van Twiller's administration, all vessels touching at New Amsterdam were required to unload and and reload or transfer; if this were not done a heavy toll was imposed. This transfer located a class of merchants and traders and doubtless contributed not a little to the prosperity of the town.‡ The mere value of a physical transfer to vessels is seen in the statement, made in 1901, that every ship that clears from New York has caused the expenditure of from \$2,000 to \$20,000.§

* *The Theory of Transportation*, C. H. Cooley, p. 91.

† *The Growth of Cities*, A. F. Weber, 1905, p. 73.

‡ *Memorial History of New York*, p. 191, Vol. 1, Wilson.

§ "Harper's Weekly," Dec. 21, 1901, *The Commercial Losses of New York*.

It would be interesting to know how much of the five hundred million dollars' worth of exports from New York are transferred in ownership, but no statistics showing this have been found. However, an idea can be gained from the statistics given in the Board of Trade Reports of the city of Chicago. Taking the mean of the years, 1875, 1880, 1885, 1890, it appears that the following percentages of the entire shipments east from Chicago are billed direct to Europe on through bills of lading:

Wheat.....	8.3 per cent.
Flour.....	9.1 per cent.
Corn	16.7 per cent.

In view of these facts, it seems reasonable to believe that at least 80 per cent. of the breadstuffs change ownership at the exporting port. This for the twenty years, 1886-1905, would give an annual change in ownership of breadstuffs alone amounting in value to \$30,000,000.* Assuming that half the annual exports and imports at New York change ownership, it would involve a business of \$500,000,000, a sum which would account for that city's being the financial center of the country.

The imports at New York considerably exceed the exports, and their value is over half of the total value of the imports of the United States. This excess of imports clearly arises primarily from the use of the port for exports. Exports in a measure control imports. The cheap water route westward from New York not only furnishes cheap rates, but by its potential competition, keeps down freight rates on railroads. The concentration of railroads and canal at New York has made the port a great point of export, and this in turn has provided facilities for imports.

The commercial growth, therefore, of New York is due primarily to its easy route to the interior. The splendid harbour and adjacent coal fields are important factors, the latter allowing the great development of manufactures that normally occurs in a commercial centre. The Mohawk pass offered an easy gradient, and the Mohawk Valley and Iroquois Plain offered inducements for a dense population. From the ease of construction and the demand of the inhabitants of the region came the impetus for canal and railroad building. The rapidly developing interior found a path for its exports and imports by way of the Lake, railroads and canal, and the transfer at the harbour built up a commercial and financial

* For the twenty years, 1886-1905, the average annual value of the exports of wheat from New York was \$20,991,033; of flour, \$17,431,794.

Tables in the "Report of the N. Y. Chamber of Commerce," 1905-6.

metropolis. The same facilities that invited exports to New York provided a way for imports, and the one invites the other. The presence of a trading class is retroactive and requires the presence of other classes, and this tends to build up a city. Excellent transportation, the supply of varied materials for manufactures, convenient coal and cheap labour have given to Greater New York great and varied manufactures.

There is some evidence that the momentum which New York has enjoyed because of easy access to the interior is somewhat decreasing. New Orleans and Galveston have become competitors for the interior grain export trade. The other Atlantic ports have increased their export trade. From 1868 to 1899 the percentage of the entire export values of the United States that passed through New York has shown a uniform annual relative decline of about eight per cent.—a decline small, and, perhaps, to be expected, but which, if continued, will diminish the lead of New York in export values, and, therefore, will tend to decrease the imports at that port, relatively at least. Moreover, the exports of grain in which the port of New York formerly was so prominent have shown a marked relative decrease in the last thirty years, as is shown by the following figures from the Report of the New York Produce Exchange from 1902-3, page 28:

New York's percentage of flour, wheat and corn exported from the six principal Atlantic ports:

	FLOUR. PER CENT.	WHEAT. PER CENT.	CORN. PER CENT.
1873-82	70.42	63.35	47.70
1883-92	46.06	60.22	46.57
1893-1902.....	38.14	48.33	28.16
	1892		
New York.....	32.48	38.50	24.71
Boston.....	7.05	16.31	6.51
Philadelphia.....	19.74	17.01	19.62
Baltimore.....	24.07	18.25	36.44
Norfolk.....	1.36	.25	3.13
Newport News....	15.30	9.68	9.59

The business men of New York realize the danger and, largely through their efforts, the citizens of New York State, in 1903, voted to enlarge the Erie Canal so as to allow the passage of barges of one thousand tons capacity. It is hoped by this increased capacity to restore to the Erie Canal something of its old impor-

tance. Whether the plan will succeed is an exceedingly interesting economico-geographic question, the solution of which rests with the future.

Henry Hudson discovered a northwest passage, the value of which he could not foresee; a passage which, indeed, located a great city, but whose greatest value is the opportunity which it gave to the inhabitants of the hinterland of that city.

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